IN THE CLAIMS

Please amend the claims as noted.

1. (Currently amended) An improved battery cell comprising:

a cell can having a cell casing in sealed communication with a cell cap and an interior cavity;

means for insulation of said cell casing from direct contact with said cell cap;

a first current collector formed of metallic foil and having a first planar surface and a second planar surface;

said first planar surface in contact with said cell cap;

a first electrode adhered to said second planar surface, said first electrode and said first current collector thereby forming a unitary structure;

a porous second current collector having an upper planar surface and a lower planar surface;

said second current collector formed of non-metallic material from a group of materials consisting of article-dispersed plastic tape and plastic dispersed carbon tape;

said lower planar surface in contact with said cell casing;

a second electrode adhered to said upper planar surface, said second current collector and said second electrode thereby forming a second unitary structure; and

a separator in contact with said upper planar surface and

said second planar surface, said separator sufficiently porous to allow passage of electrolyte therethrough in said interior cavity.

2.(Original) The improved battery cell as defined in claim 1 additionally comprising at least one of said first electrode and said second electrode being rendered fire retardant by addition of fire retardant material to actives forming said electrodes.

3. (Original) The improved battery cell as defined in claim one additionally comprising:

means to bias the first current collector against the cell cap and concurrently bias the second current collector against the cell casing.

4.(Original) The improved battery cell as defined in claim 3 wherein said means to bias the first current collector against the cell cap and concurrently bias the second current collector against the cell casing is provided by said material comprising said first current collector and said second current collector being compressed when said cell casing is in said sealed communication with said cell cap and thereafter being in biased communication with said first current collector and said second current collector.

5.(Currently Amended) An improved battery cell comprising:

a cell can having a cell casing in sealed communication with a cell cap and having an interior cavity;

means for insulation of said cell casing from direct contact with said cell cap;

a first current collector in said interior cavity having a first planar surface and a second planar surface;

said first planar surface in contact with said cell cap;

a first electrode adhered to said second planar surface, said first electrode and said first current collector thereby forming a unitary structure;

a porous second current collector in said interior cavity having an upper planar surface and a lower planar surface;

said lower planar surface in contact with said cell casing;

a second electrode adhered to said upper planar surface, said second current collector and said second electrode thereby forming a second unitary structure;

said first current collector and said second current collector, both formed from one or a combination of materials from a group of materials consisting of particle-dispersed plastic tape, plastic dispersed carbon tape, fiber dispersed conductive plastic and carbon tape, particle and metallic powder dispersed conductive plastic; and

a separator in contact with said upper planar surface and said second planar surface.

6.(Original) The improved battery cell as defined in claim 5 additionally comprising at least one of said first current collector and said second current collector being rendered fire retardant by addition of collector fire retardant material thereto.

7. (Original) The improved battery cell as defined in claim 5 wherein said collector fire retardant material is comprised of one or a combination of a group of collector fire retardant materials consisting of aluminum trihydrate, magnesium hydroxide, decabromodiphenyl tetradecabromodiphenoxy benzene, lithium carbonate, ethylene bistetrabromophthalimide, $C_{12}OBr_{10}$, and $C_{18}O_2Br_4$.

8. (Original) The improved battery cell as defined in claim 5 wherein said collector fire retardant material is comprised of one or a combination of a group of collector fire retardant materials consisting of Li_2CO_3, Na_2CO_3, and $CaCO_3$.

9.(Original) The improved battery cell as defined in claim 5 additionally comprising said first electrode and said second electrode being rendered fire retardant by addition of active fire retardant material to the active material forming one or both of said first and said second electrode.

10.(Original) The improved battery cell as defined in claim 9 wherein said active fire retardant material is comprised of one or a combination of active fire retardant materials from a group of active fire retardant materials consisting of aluminum trihydrate, magnesium hydroxide, decabromodiphenyl tetradecabromodiphenoxy benzene, lithium carbonate, ethylene bistetrabromophthalimide, Li_2CO_3, Na_2CO_3, and $CaCO_3$.

11.(Original) The improved battery cell as defined in claim 6 additionally comprising said first electrode and said second electrode being rendered fire retardant by addition of active fire retardant material to the active material forming one or both said first and said second electrode.

12. (Original) The improved battery cell as defined in claim 11 wherein said active fire retardant material is comprised of one or a combination of active fire retardant materials from a group of active fire retardant materials consisting of aluminum trihydrate, magnesium hydroxide, decabromodiphenyl tetradecabromodiphenoxy benzene, lithium carbonate, ethylene bistetrabromophthalimide, Li_2CO_3, Na_2CO_3, and $CaCO_3$.

13.(Original) The improved battery cell as defined in claim 5 additional comprising:

means to bias the first current collector against the cell cap and concurrently bias the second current collector against the cell casing.

14.(Original) The improved battery cell as defined in claim 13 wherein said means to bias the first current collector against cell cap and concurrently bias said second current collector against said cell casing is provided by said material forming said first current collector and said material forming said second current collector being compressed when said cell casing is in said sealed communication with said cell cap and thereafter being in biased communication with said first current collector and said second current collector.

15.(currently amended) An improved battery cell comprising:

a cell can having a cell casing in sealed communication with a cell cap and having an interior cavity;

means for insulation of said cell casing from direct contact with said cell cap;

a first current collector in said interior cavity having a first planar surface and a second planar surface;

said first planar surface in contact with said cell cap;

a <u>porous</u> second current collector in said interior cavity having an upper planar surface and a lower planar surface;

said lower planar surface in contact with said cell casing;

said first current collector and said second current collector, both formed from one or a combination of collector materials from a group of collector materials consisting of particle-dispersed plastic tape and plastic dispersed carbon tape;

actives added to said materials forming said first current collector and said second current collector whereby said first current collector is also a first electrode and said second current collector is also a second electrode; and

a separator in contact with said upper planar surface and said second planar surface, said separator sufficiently porous to allow passage of electrolyte in said interior cavity.

16.(Original) The improved battery cell as defined in claim 9 additionally comprising at least one of said first electrode and said second electrode being rendered fire retardant by addition of active fire retardant material to said active material added to said materials forming said first and said second current collectors.

17. (Original) The improved battery cell as defined in claim 16 wherein said active fire retardant material is comprised of one or a combination of active fire retardant materials from a group of active fire retardant materials consisting of aluminum trihydrate, magnesium hydroxide, decabromodiphenyl tetradecabromodiphenoxy benzene, lithium carbonate, ethylene bistetrabromophthalimide, Li_2CO_3, Na_2CO_3, and $CaCO_3$.

18. (Original) The improved battery cell as defined in claim 16 additionally comprising:

means to bias the first current collector against the cell cap and concurrently bias the second current collector against the cell casing.

19.(Original) The improved battery cell as defined in claim 18 wherein said means to bias the first current collector against cell cap and concurrently bias said second current collector against said cell casing is provided by said material forming said first current collector and said material forming said second current collector being compressed when said cell casing is in said sealed communication with said cell cap and thereafter being in biased communication with said first current collector and said second current collector.

20. (Original) The improved battery cell as defined in claim 1 wherein said first electrode and said second electrode are formed of one or a combination of active materials from a group of active materials consisting of Li, Co, O, Ni, Mn, C, S, and Lithium metal.

21. (Original) The improved battery cell as defined in claim 5 wherein said first electrode and said second electrode are formed of one or a combination of active materials from a group of active materials consisting of Li, Co, O, Ni, Mn, C, S, and Lithium metal.

22. (Original) The improved battery cell as defined in claim 15 wherein said first electrode and said second electrode are formed of one or a combination of active materials from a group of active materials consisting of Li, Co, O, Ni, Mn, C, S, and Lithium metal.

23. (Original) The improved battery cell as defined in claim 1 wherein said cell is cylindrical in shape.

24. (Original) The improved battery cell as defined in claim 2 wherein said second current collector is formed of metallic material.

25. (Withdrawn)

26.(Original) The improved battery cell as defined in claim 1 further comprising:

said battery cell charged upon manufacture to a maximum charge between 0 to 10% of the capacity of said battery cell whereby said battery cell may be shipped or stored without suffering corrosion or degradation.

27. (Original) The improved battery cell as defined in claim 5 further comprising:

said battery cell charged upon manufacture to a maximum charge between 0 to 10% of the capacity of said battery cell whereby said battery cell may be shipped or stored without suffering corrosion or degradation.

28.(Original) The improved battery cell as defined in claim 11 further comprising:

said battery cell charged upon manufacture to a maximum charge between 0 to 10% of the capacity of said battery cell whereby said battery cell may be shipped or stored without suffering corrosion or degradation.

29. (Currently Amended) An electrode apparatus for use in constructing a lithium ion battery cell comprising:

a first current collector formed of metallic foil and having a first planar surface and a second planar surface;

said first planar surface in contact with a first conductor for communicating electrical current to and away therefrom;

a first electrode adhered to said second planar surface, said first electrode and said first current collector thereby forming a unitary structure;

a porous second current collector having an upper planar surface and a lower planar surface;

said second current collector formed of non-metallic material from a group of materials consisting of particle-dispersed plastic tape and plastic dispersed carbon tape;

said lower planar surface in contact a second conductor to communicate electrical current to and away therefrom;

a second electrode adhered to said upper planar surface, said second current collector and said second electrode thereby forming a second unitary structure; and

a separator in contact with said upper planar surface and said second planar surface, said separator sufficiently porous to allow passage of electrolyte therethrough.

30. (Currently Amended) An electrode apparatus for use in constructing a lithium ion battery cell comprising:

a first current collector having a first planar surface and a second planar surface;

said first planar surface communicating with a first battery terminal exterior to said battery cell;

a first electrode adhered to said second planar surface, said first electrode and said first current collector thereby forming a unitary structure;

a second current collector in said interior cavity having an upper planar surface and a lower planar surface;

said lower planar surface communicating with a second battery terminal exterior to said battery cell;

a second electrode adhered to said upper planar surface, said second current collector and said second electrode thereby forming a second unitary structure;

said first current collector and said second current collector, both <u>being porous and</u> formed from one or a combination of materials from a group of materials consisting of particle-dispersed plastic tape, plastic dispersed carbon tape, fiber dispersed conductive plastic and carbon tape, particle and metallic powder dispersed conductive plastic; and

a separator in contact with said upper planar surface and said second planar surface, said separator sufficiently porous to allow passage of electrolyte therethrough.

31. (Currently Amended) An electrode apparatus for use in constructing a lithium ion battery cell a cell having a cell casing in sealed insulated communication with a cell cap said sealed communication defining an interior cavity comprising:

a first current collector in said interior cavity having a first planar surface and a second planar surface;

said first planar surface in contact with said cell cap;

a second current collector in said interior cavity having an upper planar surface and a lower planar surface;

said lower planar surface in contact with said cell casing;

said first current collector and said second current collector, both <u>being porous and</u> formed from one or a combination of collector materials from a group of collector materials consisting of particle-dispersed plastic tape and plastic dispersed carbon tape;

actives added to said materials forming said first current collector and said second current collector whereby said first current collector is also a first electrode and said second current collector is also a second electrode; and

a separator in contact with said upper planar surface and said second planar surface, said separator sufficiently porous to allow passage of electrolyte in said interior cavity.

Claim Rejections per Schena per 35 USC §102

The examiner has rejected prior claims 1,3-5,13-15,18-24, and 29-31 per Dasgupta under *35 USC §102*.

Dasgupta, as cited in Applicants' application (at page 7, line 13) teaches against applicants device as taught and claimed. Dasgupta attempts to solve the problem of corrosion of the current collector in the battery, by using an extra electrically conductive ceramic layer adhered to the metal cover and case of the battery. In the alternative, Dasgupta teaches that an non-porous electrically conductive polymer can be placed in a stacked relationship between the electrodes and the metal cover and case forming the battery container.

In both embodiments taught by Dasgupta there is the strict requirement of insulating the cover and can from internal liquids and corrosive elements using either the ceramic coating, or a polymer layer, which must be continuous, coherent, and non-porous to prevent the severe corrosion caused by contact of the electrodes with the metal surfaces protected.

At Column 4 line 24-35 Dasgupta defines that the coating or separator must be "pore free" or in other words " continuous and coherent." So the use of the terms continuous and coherent in Dasgupta is defined as pore free or non porous.

In both Figure 1 and Figure 3 of Dasgupta, a non porous coating is shown adhered to the battery case (see 7 and 7a).

At Column 4, line 6, Dasgupta states that "it is therefor desirable to place a corrosion protector layer between the electrode and the metallic current collector." At column 4, lines 17-35, Dasgupta discussed the use of a ceramic layer that is pore free, continuous, and coherent. At column 5 lines 40-45 Dasgupta again teaches that the casing has a continuous, coherent coating completely separating the actives from the electrode. This teaching of a non-porous layer is further taught at Column 5 lines 14-20 where it is noted that the preferred *laminated* polymer would be cut to completer cover and preferably overlap the major face of the electrode.

Still further, while the non porous ceramic is the stated favorite way to avoid corrosion of the current collector, Dasgupta states that a polymer might be used if, just like the ceramic layer, it is a "*continuous and coherent laminated* polymer."

Applicant, at page 11, line 24 of the application, clearly teaches just the opposite of Dasgupta in stating that it is a further object of this invention to eliminate the need for non-porous layers to be stacked between the metal cell walls and the electrodes. Further, Dasgupta, was specifically cited in Applicants' application to teach and claim just such non porous continuous and coherent layers to separate the metal cell walls from the electrodes.

As such, the cited art lacks the porous current collector claimed by applicant and requires that the current collector be non-porous and/or totally separated from the metal cell wall by a

ceramic layer in-between. It was also noted in that section of Applicants' specification that the requirement of a non-porous divider or separator makes Dasgupta more expensive and not easily manufactured and fails to address the problem of shards and debris contaminating the electrodes and the need to pre-charge the battery before shipment to avoid corrosion.

> "Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim." ***Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.***, 221 USPQ 481, 485 (Fed. Cir. 1984).

The cited reference thus and lacks the element of porosity of applicant's claimed invention arranged as in claims 1, 3-5, 13-15, 18-24, and 29-31, and all subordinate claims thereto. The objection under Section 102 per Dasgupta, which teaches and claims the opposite of the porous nature of applicant's device is respectfully traversed.

Further, Dasgupta as noted teaches away from the porous solid solution polymer taught by Applicant and instead teaches a non-porous ceramic coating or layered polymer which is continuous and coherent. It would not be proper to infer obviousness from such a teaching by Dasgupta which instructs directly against the teaching of Applicant under the holding of In re Rosenberger and Brandt CCPA156 USPQ 24 at 26, 1967) where it was stated:

> [1] We disagree. This argument assumes that Varela teaches that spraying the mold and dusting the preform are equivalent methods. This is incorrect, for Varela clearly teaching that the dusting and pill preform methods of coating yield unsatisfactory products. The teaching of Varela therefore discourages research in the very field where appellants made their invention. Appellants have shown prima facie by affidavit their products to be superior to those produced by the dusting and pill preform methods disclosed by Varela. They have invented a method for producing an effective protective coating in the fact of art which strongly suggests that such a method would produce unacceptable results. This is the very antithesis of obviousness. (In re Rosenberger and Brandt CCPA156 USPQ 24 at 26, 1967)

As such the objections per Dasgupta are respectfully traversed under Section 102.

Claim Rejections per Dasgupta and Endo under 35 USC §103

The Examiner has rejected claims 2,9,11,12,16-17 as being unpatentable over Dasgupta in view of Endo.

As noted above, the teachings of Dasgupta are directly the opposite of the teachings and claims of applicants' device and any combination with Endo must also fail. Further, Dasgupta makes no mention whatsoever of inclusion of fire retardants.

Endo teaches the common manner of using a slurry mixture to form the actives and electrodes of a battery and makes no mention or suggestion of inclusion with a porous polymer formed of a solid solution or even using a non porous laminated construction of Dasgupta.

As such, the modifications are unsuggested in both of the cited prior art and would be an improper combination.

> Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. Under section 103, teachings of references can be combined only if there is some suggestion or incentive to do so. The prior art of record fails to provide any such suggestion or incentive. Accordingly, we hold that the court below erred as a matter of law in concluding that the claimed invention would have been obvious to one of ordinary skill in the art under section 103. (ACS Hospital Systems, Inc. v. Montefiore Hospital et al CA FC 221 USPQ 929 at 933,1984)

Instead, having a knowledge of the applicants' device as a teaching guide, the Examiner may have strayed into a hindsight analysis. A rejection based on such a hindsight selection of features is not a proper combination as the Court of Appeals for the Federal Circuit said in Connell et al. v. Sears, Roebuck & Co. (CA FC, 1983), 20 USPG 193 at 199:

> "The opinion says obviousness is established when 'features that distinguish' the invention from the closest reference 'are disclosed in analogous structures in which the features perform the identical function'. It is not 'features' but the subject matter as a whole which must be considered, 35 U.S.C. 103. That features, even distinguishing features, are 'disclosed in the prior art' is alone insufficient. As above indicated, it is common to find elements or features somewhere in the prior art. Moreover, most if not all elements perform their ordained and expected function. The test is whether the claimed invention as a whole, in light of all the teachings of the references in their entireties, would have been obvious to one of ordinary skill in the art at the time the invention was made."

The Examiner may have strayed into a hindsight analysis with the benefit of knowing applicant's device in advance of the review for obviousness.

> "When prior art references require selective combination by the court to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gleaned from the invention itself." Interconnect Planning Corp. 774 F.2d at 1143, 227 USPQ at 551. See also Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), cert. denied, 475 U.S. 1017 (1986). Something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination. Lindemann Maschinenfabrik GmbH v. American Hoist and Derrick Co., 730 F.2d 1452, 1462,221 USPQ 481,488 (Fed. Cir. 1984).